We claim:

1. In a method for making a non-porous body of high purity fused silica glass comprising the steps of:

(a) producing a gas stream containing a silicon-containing compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO_2;

(b) passing said gas stream into the flame of a combustion burner to form amorphous particles of fused SiO_2;

(c) depositing said amorphous particles onto a support; and

(d) either essentially simultaneously with said deposition or subsequently thereto consolidating said deposit of amorphous particles into a non-porous body;

the improvement comprising utilizing as said silicon-containing compound in vapor form, a halide-free [polymethylsiloxane] polymethylcyclosiloxane, whereby no halide-containing vapors are emitted during the making of said non-porous body of high purity fused silica glass.

[2. A method according to claim 1 wherein said polymethylsiloxane is hexamethyldisiloxane.]

[3. A method according to claim 1 wherein said polymethylsiloxane is a polymethylcyclosiloxane.]

[4. A method according to claim 3]1 wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane,

hexamethylcyclotrisiloxane, and mixtures thereof.

5. A method according to claim 1 wherein said gas stream is comprised of an inert gas.

6. A method according to claim 5 wherein said inert gas is nitrogen.

7. In a method for making a non-porous body of high purity fused silica glass doped with at least one oxide dopant comprising the steps of:

(a) producing a gas stream containing a silicon-containing compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO_2 and a compound in vapor form capable of being converted through oxidation or flame hydrolysis to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, and the rare earth series of the Periodic Table;

(b) passing said gas stream into the flame of a combustion burner to form amorphous particles of fused SiO_2 doped with an oxide dopant;

(c) depositing said amorphous particles onto a support; and

(d) either essentially simultaneously with said deposition or subsequently thereto consolidating said deposit of amorphous particles into a non-porous body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free polymethylsiloxane, whereby no halide-containing vapors from said silicon-containing compound are emitted during the making of said non-porous body of high fused silica glass.

8. A method according to claim 7 wherein said polymethylsiloxane is hexamethyldisiloxane.

9. A method according to claim 7 wherein said polymethylsiloxane is a polymethylcyclosiloxane.

10. A method according to claim 9 wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, hexamethylcyclotrisiloxane, and mixtures thereof.

11. A method according to claim 7 wherein said compound in vapor form capable of being converted to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, and the rare earth series of the Periodic Table is a halide-containing compound.

12. A method according to claim 7 wherein said compound in vapor form capable of being converted to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, V[B]A, and the rare earth series of the Periodic Table is a halide-free compound.

13. In a method for making optical waveguide fibers of high purity fused silica through the outside vapor

deposition process comprising the steps of:

(a) producing a gas stream containing a silicon-containing compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO_2;

(b) passing said gas stream into the flame of a combustion burner to form amorphous particles of fused SiO_2;

(c) depositing said amorphous particles onto a mandrel;

(d) consolidating said deposit of amorphous particles into a non-porous, transparent glass body; and

(e) [and] drawing optical waveguide fiber from said body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free polymethylsiloxane, whereby no halide-containing vapors are emitted during the making of said optical waveguide fibers.

14. A method according to claim 13 wherein said polymethylsiloxane is hexamethyldisiloxane.

15. A method according to claim 13 wherein said polymethylsiloxane is a polymethylcyclosiloxane.

16. A method according to claim 15 wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, hexamethylcyclotrisiloxane, and mixtures thereof.

17. In a method for making optical waveguide fibers of high purity fused

silica glass doped with an oxide dopant comprising the steps of:

(a) producing a gas stream containing a silicon-containing compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO_2 and a compound in vapor form capable of being converted through oxidation or flame hydrolysis to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, and the rare earth series of the Periodic Table;

(b) passing said gas stream into the flame of a combustion burner to form amorphous particles of fused SiO_2 doped with an oxide dopant;

(c) depositing said amorphous particles onto a mandrel;

(d) consolidating said deposit of amorphous particles into a non-porous transparent glass body; and

(e) drawing waveguide fiber from said body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free polymethylsiloxane, whereby no halide-containing vapors from said silicon-containing compound are emitted during the making of said optical waveguide fibers.

18. A method according to claim 17 wherein said polymethylsiloxane is hexamethyldisiloxane.

19. A method according to claim 17 wherein said polymethylsiloxane is a polymethylcyclosiloxane.

20. A method according to claim 19 wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, hexamethylcyclotrisiloxane, and mixtures thereof.

21. A method according to claim 17 wherein said [compounding] compound in vapor form capable of being converted to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, and the rare earth series of the Periodic Table is a halide-containing compound.

22. A method according to claim 17 wherein said compound in vapor form capable of being converted to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, and the rare earth series of the Periodic Table is a halide-free compound.

23. In a method of making high purity fused silica glass through the outside vapor deposition process comprising the steps of:

(a) producing a gas stream containing a silicon-containing compound in vapor form capable of being converted through thermal

decomposition with oxidation or flame hydrolysis of SiO_2;

(b) passing said gas stream into the flame of a combustion burner to form amorphous particles of fused SiO_2;

(c) depositing said amorphous particles onto a mandrel; and

(d) consolidating said deposit of amorphous particles into a non-porous, transparent glass body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free [polymethylsiloxane] polymethylcyclosiloxane, whereby no halide-containing vapors from said silicon-containing compound are emitted during the making of said high purity fused silica glass.]

[24. A method according to claim 23 wherein said polymethylsiloxane is hexamethyldisiloxane.]

[25. A method according to claim 23 wherein said polymethylsiloxane is a polymethylcyclosiloxane.]

[26. A method according to claim [25]23 wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, hexamethylcyclotrisiloxane, and mixtures thereof.]

[27. A method according to claim 23, wherein said polymethylcyclosiloxane is octamethylcyclotetrasiloxane.]

28. A method according to claim 27, wherein said octamethylcyclotetrasiloxane increases deposition efficiency over that achieved when silicon tetrachloride is utilized as

said silicon-containing compound in vapor form.

29. A method according to claim 28, wherein the deposition efficiency increase is about 20%.

30. A method according to claim 1, wherein said polymethylcyclosiloxane is octamethylcyclotetrasiloxane.

31. A method according to claim 30, wherein said octamethylcyclotetrasiloxane increases deposition efficiency over that achieved when silicon tetrachloride is utilized as said silicon-containing compound in vapor form.

32. A method according to claim 31, wherein the deposition efficiency increase is about 20%.

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